QTP 4Y0X2-2
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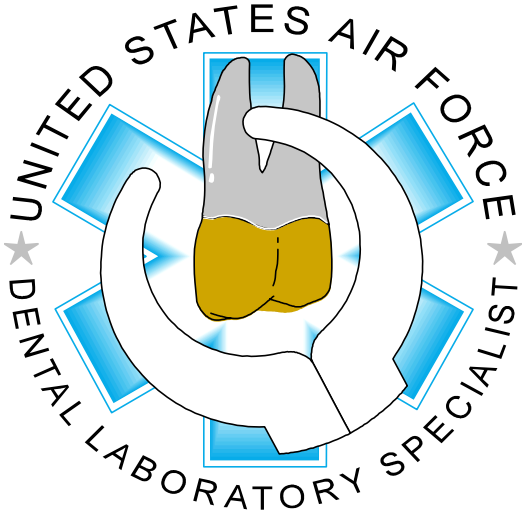
DENTAL LABORATORY SPECIALTY

Volume 2. Fabricating Fixed Restorations



381st Training Squadron

917 Missile Road

Sheppard AFB TX 76311-2246

Qualification Training Package Author:	MSgt Mark T. Cochrane
Supervisory Training Specialist:	Virgil Watson
Office of Primary Responsibility:	HQ/USAF SGWD Certified By: CMSgt James R. Gwyn Pages: 75

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Volume 2, *Fabricating Fixed Restorations*, contains modules on such procedures as fabricating post and cores; interim restorations; full gold, metal-ceramic, and metal-resin restorations, and porcelain laminate veneers. This QTP is designed to enhance 5- and 7-skill level OJT of dental laboratory personnel. The 4Y0X2 Career Development Course may be used to compliment the training references listed in each module. All four QTPs are intended to be used by trainees, trainers, supervisors, and task certifiers. Before initiating any training you should review your responsibilities--as a supervisor/trainer--for conducting on-the-job training (OJT) per AFI 36-2201, *Developing, Managing, and Conducting Training.*

Six months after the apprentice graduates, you should receive a survey that allows you to evaluate the in-residence apprentice course. This poll is a valuable tool; your feedback is critical to improving our 3 level course and your career field. Subsequently, 3-skill level training provides a foundation for your OJT. Once you begin upgrade training you are required to use the QTPs.

QTPs are designed to help you conduct and evaluate your field training. QTPs provide continuity to the trainee's upgrade training and are divided into the following volumes: 1) *General Skills;* 2) *Fabricating Fixed Restorations;* 3) *Fabricating Removable and Orthodontic Appliances; and* 4) *Administration and Management*. The QTP modules were written to assist you in preparing for and conducting training. You *must* use the QTP modules for training when either: 1) the STS task is a core task (minimum qualification for the specialty); or 2) you have identified the STS task as a requirement of the trainee's job. Each module segments the major tasks into teachable elements. Your goal is to provide enough training and guidance so trainees can do all task related steps, without assistance, and produce an appliance that meets local requirements for speed and accuracy. QTPs also aid OJT task certifiers in evaluating the trainee's demonstrated performance. If you have local training requirements not covered by a QTP module you *should* develop "steps in performance" and "performance checklists" that support and standardize those tasks.

Accompanying each volume of QTPs is a *qualification training progress record.* This QTP record serves as an interim document to record the date trainee completes each module. Every person in qualification/upgrade training *must* have this QTP progress record filed in their OJT folder. Use and annotation of this progress record is similar to current OJT documentation. When *you* are satisfied the trainee meets standards, as prescribed in the QTP performance checklist, *you* must document and initial each task completion date in column 2B of the Specialty Training Standard (STS) and the "date completed" column in the QTP progress record. If a person is being recertified on a task that is supported by a QTP you must use that module to complete the recertification process.

Typically, you will manage each module by first, training the tasks and then, evaluating performance. Your local steps in performance may vary from the method listed in the QTP module. If this is the case, you are authorized to make changes to the first half of each module, (i.e. steps in task performance); however, the "performance checklist" is considered a *standard* and cannot be altered. You may train each QTP volume/module in

any sequence; however, when conducting training use an organized and methodical approach. This will reduce your training time and enhance your efforts.

When beginning any training process you should first, review the procedures in each module with the trainee. Second, direct the trainee to review the training references listed to prepare for task performance. Third, go through the steps in task performance with the trainee, allowing enough time to adequately train each step (some modules may take longer to teach). Forth, evaluate the trainee's work at each critical step--using the performance checklist at this point will be helpful. Fifth, evaluate the trainee's performance and provide feedback on any areas for improvement. Finally, when the trainee has successfully completed the task you must document and initial both the STS and the QTP progress record. If the trainee does not accomplish the module, conduct follow-up instruction until the trainee successfully completes the task.

The QTP goal of the 381 TRS/XWAA, Sheppard AFB TX, is to publish a useable document for trainers and trainees. You are encouraged to write-in changes or revisions to the QTPs. A corrections/improvements letter is located on the last page of each QTP volume. You may choose to call in your recommendations to DSN 736-7008 or FAX DSN/Commercial 736-6928 or (817) 676-6928 or email the author at mark.cochrane@sheppard.af.mil

The inclusion of names of any specific commercial product, commodity, or service in this publication is for informational purposes only and does not imply endorsement by the Air Force.

MODULE 1. FABRICATING POST AND CORES

STS TASK REFERENCE(S):

4d Fabricate indirect post and cores

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*

EVALUATION INSTRUCTIONS:

Demonstrate how to fabricate post and cores following either locally established procedures or steps in task performance below. In waxing the pattern, emphasize the need for the post to completely fill the canal to the apical tip. Explain how to wax-up a properly contoured core to simulate a crown preparation. Ensure adequate space for subsequent crown fabrication. Have the trainee fabricate post and cores and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Vibrator
Air Abrasive Unit
Bench Lathe
Burnout Oven
Casting Alloy
Ultrasonic Cleaner
Casting Machine
Dead Soft Wax
Disclosing Medium
Distilled Water
Inlay wax
Investment Ring
Rubber Points and Wheels
Spruing Wax/plastic sprues
Bunsen Burner
Burs
Casting Investment
Cutting Disk
Debubblizer
Disinfectant Solution
Graduated Cylinder
Handpiece
Mixing Bowl
Sprue Former
Torch
Vacuum Mixer
Waxing Instruments

STEPS IN TASK PERFORMANCE:

1. Inspect cast for voids or nodules
2. Have prescribing dentist identify margins, if necessary
3. Apply separating medium to interior of preparation and entire area that will be waxed
4. Cut notches in plastic sprue to aid in retention of wax
5. Trim tip of plastic sprue to fit into root canal to extend to bottom of preparation
6. Fill apical end of canal with dead soft wax using PKT No. 2
7. Warm sprue slightly (not melting) and insert completely in wax
8. Allow wax to cool and remove wax post
9. Rewax if pattern has voids or breaks
10. Replace pattern in previous position
11. Build up core of pattern with inlay wax to simulate contours of an ideal crown preparation
12. Refine margins of pattern using preferred waxing instrument
13. Sprue post and core pattern on incisal or occlusal surface
14. Invest pattern, with no ring liner and/or add 1 or 2 cc more water to reduce expansion
15. Cast pattern with requested metal
16. Divest and deoxidize casting
17. Remove nodules using burs or stones
18. Check casting fit using disclosing medium and gently seating casting into preparation
19. Relieve spots disclosed by medium, repeat until casting seats into preparation and margins are closed
20. Desprue casting
21. Recontour the sprue attachment area
22. Finish core area using stones and rubber wheel
23. Air abrade entire casting
24. Place casting in ultrasonic cleaner for 2 to 3 minutes
25. Disinfect restoration

MODULE 1. FABRICATING POST AND CORES

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to fabricate post and cores and satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

FABRICATING INDIRECT POST AND CORES

DID THE TRAINEE…?	YES	NO
1. Inspect the cast to ensure it is free of voids and nodules		
2. Apply die separator over entire area to be waxed		
3. Fill the canal to the apical end with wax		
4. Wax post and core to correct contours		
5. Sprue post and core pattern on incisal or occlusal surface		
6. Invest pattern to produce acceptable mold expansion		
7. Cast pattern producing an accurate, dense casting		
8. Fit casting without damaging master cast		
9. Contour to correct shape, finish to smooth surface, and air abrade entire casting		
10. Disinfect restoration		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 2. FABRICATING INTERIM CROWNS AND FIXED PARTIAL DENTURES

STS TASK REFERENCE(S):

4e Fabricate interim crowns and fixed partial dentures

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*

EVALUATION INSTRUCTIONS:

Typically, when dental laboratory personnel fabricate interim restorations, they only make the stent and process the acrylic resin. The restoration is then completed chairside by the dentist. Demonstrate how to construct a stent and process the resin for interim crowns and fixed partial dentures. Ensure tooth contours are corrected and edentulous spaces are filled before fabricating a matrix. Have the trainee construct a stent and process the resin for interim crowns and fixed partial dentures and suggest ways to improve performance. After the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Acrylic Resin
Bard Parker
Cast Trimmer
Dental Stone
Disinfectant Solution
Duplicating Material
Inlay Wax
Mixing Container
Pencil
Polishing Compound
Pressure Pot
Rubber Bands
Separating Medium
Small Artist Brush
Spatula
Stent Material
Tooth-Shade Acrylic
Vacuum Former
Vacuum Mixer
Vacuum Mixing Bowl

STEPS IN TASK PERFORMANCE:

1. If cast has an edentulous area in the area to be restored, grind denture tooth into occlusion
2. If tooth to be restored has abnormality (fractured cusp), build up to normal contours with wax or acrylic resin
3. If required, duplicate master cast for vacuum forming the stent material
4. Fabricate matrix on cast using stent material and vacuum former unit
5. Cut stent material to include tooth to be restored and one adjacent tooth on each side
6. Remove matrix from diagnostic cast
7. Disinfect impression of prepared teeth received from dentist
8. Fabricate working cast
9. Apply separating medium to working cast
10. Mix appropriate tooth-shade acrylic in dappen dish
11. Pour thin stream of tooth-shade acrylic into matrix with no bubbles
12. Invert matrix onto working cast
13. Secure matrix to cast using rubber band
14. Cure restoration in pressure pot filled with 115 °F water for 30 minutes at 20 psi
15. Remove matrix and separate restoration from cast
16. Remove excess acrylic from adjacent teeth using Bard Parker, if required
17. Finish and polish axial contours, avoid over finishing interproximal contact areas
18. Disinfect restoration and return restoration to dentist for completion chairside

MODULE 2. FABRICATING INTERIM CROWNS AND FIXED PARTIAL DENTURES

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to fabricate interim restorations and satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

FABRICATING INTERIM CROWNS AND FIXED PARTIAL DENTURES

DID THE TRAINEE…?	YES	NO
1. Establish desired contours on the cast before fabricating the matrix		
2. Fabricate an accurate matrix		
3. Fabricate an accurate working cast of the prepared teeth		
4. Process acrylic resin without porosity		
5. Trim and polish restoration to proper contour		
6. Disinfect restoration		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 3. WAXING FIXED PROSTHODONTIC PATTERNS TO ANATOMICAL FORM

STS TASK REFERENCE(S):

4f(1) Prepare dies for waxing
4f(2) Wax patterns to anatomical form

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*

EVALUATION INSTRUCTIONS:

Demonstrate how to prepare dies for waxing and wax patterns to full contour using the wax additive technique. Have the trainee wax patterns to full contour and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Artist Brush
Bunsen Burner
Die Sealer
Inlay Wax
Powdered Wax
Wax Pencil (Red & Blue)
Blockout Material
Die Lubricant
Die Spacer
Microscope
Rubber Dam
Waxing Instruments

STEPS IN TASK PERFORMANCE:

1. Inspect die preparation for undercuts or nodules in pattern area
2. Check bite for adequate reduction
3. Verify mounting and check for proper contact of existing teeth
4. Adjust articulator settings to corresponds with wear facets and/or prescribed guidance
5. Blockout any undercuts with blockout material
6. Mark thin red line on margins using wax pencil
7. Apply die sealer
8. Allow sealer to dry
9. When directed by the dentist, apply spacer following manufacture's recommendations
10. Do not apply spacer within 1.0 mm of margins
11. Apply additional coats of die spacer, if required
12. Allow die spacer to dry
13. Apply die lubricant to pattern area and opposing teeth
14. Apply hot inlay wax to dies in rapid manner to prevent voids in wax copings
15. Trim wax from margin area using blunt carving instrument
16. Remove wax patterns using rubber dam
17. Inspect patterns for voids on intaglio surface and remake copings if required
18. Replace patterns on dies and reseal margins with inlay wax
19. Close articulator and check patterns for occlusal interference
20. Overbuild the occlusal surface and gently, but quickly, close articulator again to create a centric occlusal contact in the softened wax
21. Carve the wax back to proper anatomical and functional contours
22. Use the instrument in a palm grip to make forceful long strokes
23. Use a pen grip and finger rest for creating fine details
24. See training references for specific anatomic and functional contouring
25. Check lateral excursions for clearance and proper cusp tip placement
26. Apply wax powder to occlusal surface, disclose interferences, and remove excess wax
27. Wax secondary anatomy using existing teeth as guides
28. Refine axial contours and verify "A, B, C" contacts, using powdered wax
29. Adjust lateral and protrusive excursions
30. Verify correct proximal contact position
31. Remove wax patterns using rubber dam and apply die lubricant
32. Replace patterns on dies and refine margins
33. Use magnification to verify accuracy of margins
34. Clean patterns using preferred method

MODULE 3. WAXING FIXED PROSTHODONTIC PATTERNS TO ANATOMICAL FORM

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to wax fixed restorations and satisfactorily perform all tasks without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

WAXING FIXED PROSTHODONTIC PATTERNS TO ANATOMICAL FORM

DID THE TRAINEE…?	YES	NO
1. Inspect the dies for suitability and prepare dies as prescribed		
2. Wax copings without creating voids		
3. Carve cusp tips in proper position (cusp-to-fossa and/or cusp-to-embrasure)		
4. Carve marginal ridges to proper contour and correct occlusion		
5. Carve triangular ridges to correct occlusion		
6. Wax pontic to correct contour and occlusion		
7. Accurately refine margins of wax pattern		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 4. CONSTRUCTING CUSTOM INCISAL GUIDE TABLES

STS TASK REFERENCE(S):

STS: 4f(3) Construct custom incisal guide tables

TRAINING REFERENCE(S):

Fundamentals of Fixed Prosthodontics (Shillingburg/Hobo/Whitsett)
AFP 162-6, Vol. 3, *Dental Laboratory Technology*

EVALUATION INSTRUCTIONS:

Demonstrate how to construct a custom incisal guide tables. If the case involves anterior restorations, ensure the full contour wax-up is completed prior to making the custom incisal guide table. By doing this you will preserve the original anterior guidance for the restoration. Have the trainee construct custom incisal guide tables and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Acrylic Resin
Burs
Mixing Container
Spatula
Articulator
Incisal Guide Table
Petrolatum

STEPS IN TASK PERFORMANCE:

1. Select base for custom incisal guide table
2. Invert the incisal guide pin with the rounded end down
3. Raise incisal guide pin 1.0 mm above incisal guide table
4. Lubricate rounded end of guide pin with petrolatum
5. Mix acrylic resin to dough-like consistency and place on incisal guide table
6. Move articulator through all excursions, taking care not to damage wax-up
7. Ensure acrylic resin contacts pin through all movements
8. Continue to move through excursions until acrylic resin is polymerized
9. Trim excess acrylic resin using bur to refine guidance

MODULE 4. CONSTRUCTING CUSTOM INCISAL GUIDE TABLES

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to construct incisal guide tables and satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

CONSTRUCTING CUSTOM INCISAL GUIDE TABLES

DID THE TRAINEE…?	YES	NO
1. Set the articulator to the correct settings		
2. Mix the acrylic resin to the correct consistency and apply it to the table		
3. Move the incisal guide pin through all excursive movements		
4. Ensure the incisal guidance corresponds to the guidance indicated for the case		
5. Trim off excess acrylic resin from incisal guide table to refine movement		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 5. WAXING METAL-CERAMIC AND METAL-RESIN SUBSTRUCTURE PATTERNS

STS TASK REFERENCE(S):

4h(1) Cut back wax patterns
4g Fabricate resin veneered crowns and fixed partial dentures

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*

EVALUATION INSTRUCTIONS:

Demonstrate how to wax metal-ceramic and metal-resin substructure patterns. Stress the importance of measuring for adequate thickness before cutback. Have the trainee wax metal-ceramic and metal-resin substructure patterns and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Die Lubricant
Rubber Dam
Wax Gauge
Waxing Instruments
Bunsen Burner
Microscope
Wax Powder
Inlay wax

STEPS IN TASK PERFORMANCE:

1. Wax-up prosthesis to full contour
2. Scribe cutback design on patterns using carving instrument
3. Measure thickness of wax patterns using wax gauge
4. Ensure full contour wax-up are at least 1.2 mm thick
5. Consult dentist if wax pattern is below minimum thickness
6. Make depth cuts in patterns using discoid instrument
7. Remove and smooth out wax from within design areas using carving instrument
8. Ensure all internal sharp angles or edges are removed
9. Ensure cutback areas measure at least 0.5 mm for castability, may be thinner depending on alloy used
10. Ensure finish lines are sharp at porcelain to metal junction
11. Remove wax patterns using rubber dam and apply die lubricant
12. Replace patterns on dies and refine margins
13. Use microscope to verify accuracy of margins
14. Clean patterns using preferred method

MODULE 5. WAXING METAL-CERAMIC AND METAL-RESIN SUBSTRUCTURE PATTERNS

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to wax metal-ceramic and metal-resin substructures and satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

WAXING METAL-CERAMIC AND METAL-RESIN SUBSTRUCTURE PATTERNS

DID THE TRAINEE…?	YES	NO
1. Design cutback of the wax patterns according to case requirements		
2. Carve patterns to correct cutback design without damaging pattern		
3. Reduce patterns to correct thickness in cutback area		
4. Eliminate all sharp angles in design area and smooth wax patterns		
5. Accurately refine margins of wax patterns		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 6. SPRUING AND INVESTING WAX PATTERNS

STS TASK REFERENCE(S):

4f(4) Sprue and invest wax patterns
4h(2) Sprue and invest metal-ceramic patterns

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*
Manufacturer's Instructions

EVALUATION INSTRUCTIONS:

Demonstrate how to sprue and invest wax patterns using either the direct or indirect technique. Explain the significance of how proper sprue diameter and placement can decrease porosity in the casting. Estimate the amount of alloy needed for the casting based on the weight of the wax pattern and the specific gravity of the alloy. Describe the purpose of the orientation dot and show where it is placed on the sprue former. Have the trainee sprue and invest wax patterns and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Air Hose
Bunsen Burner
Casting Ring
Sprue Base
Debubblizer
Casting Ring Liner
Electronic Scale
Distilled Water
Inlay Wax
Graduated Cylinder
Millimeter Ruler
Investment
Small Artist Brush
Pen/Pencil
Sprue Former
Spatula
Sticky Wax
Sprue Wax
Vacuum Mixing Bowl
Vacuum Mixer
Waxing Instruments
Vibrator

STEPS IN TASK PERFORMANCE:

1. Inspect wax patterns on dies for suitability
2. Determine required size of sprue leads
3. Determine initial weight of sprue base using electronic scale before sprues are attached
4. Document weight of sprue base
5. Sticky-wax sprue leads to thickest part of patterns at 45° angle
6. Sticky-wax sprue leads to incisal edge of patterns for anterior units
7. Seal sprue leads to patterns using inlay wax
8. Trim sprue lead lengths to approximately 6.0 mm for direct and 3.0 mm for indirect method
9. Remove patterns from dies
10. Sticky wax opposite end of sprue leads to sprue base
11. Position patterns outside of the thermal zone of the investment
12. Seal sprue leads to sprue base using inlay wax
13. Place sprue base assembly on electronic scale
14. Document weight of patterns and sprue base assembly
15. Compute difference of the two weights to determine weight of wax patterns
16. Determine the amount of alloy needed, for casting, by multiplying the wax pattern weight times the alloy's specific gravity
17. Secure ring liner 3.0 mm below edge of casting ring
18. Place orientation dot on sprue base
19. Place casting ring on sprue base
20. Apply debubblizer to all surfaces of wax patterns and dry thoroughly
21. Vacuum mix investment IAW manufacturer's instructions
22. Paint on investment inside wax patterns using brush
23. Attach lined casting ring to sprue base
24. Fill casting ring with investment
25. Allow investment to set IAW manufacturer instructions

MODULE 6. SPRUING AND INVESTING WAX PATTERNS

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to sprue and invest wax patterns and satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

SPRUING AND INVESTING WAX PATTERNS

DID THE TRAINEE…?	YES	NO
1. Use the correct gauge and length of sprue		
2. Sprue to thickest part of the wax patterns		
3. Position patterns out of the thermal zone		
4. Secure liner in casting ring correctly		
5. Apply debubblizer and dry thoroughly		
6. Mix the correct investment IAW manufacturer's direction		
7. Invest the pattern without creating voids		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 7. CASTING FIXED RESTORATIONS

STS TASK REFERENCE(S):

4f(5) Burnout and cast restorations
4h(3) Burnout and cast substructures
4f(6) Deoxidize castings

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*
Manufacturer's Instructions

EVALUATION INSTRUCTIONS:

Demonstrate how to burnout, cast, and deoxidize restorations. Stress the need to balance the casting arm and ensure the mold is damp prior to burnout. Explain why separate crucibles are used for different types of alloys. Have the trainee burnout, cast, and deoxidize restorations and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Air Abrasive Unit
Casting Alloy
Casting Machine
Knife
Striker
Burnout Furnace
Casting Flux
Casting Torch (Gas/Air, Gas/Oxygen)
Safety Goggles
Tongs

STEPS IN TASK PERFORMANCE:

1. Ensure burnout furnace is at room temperature
2. Ensure molds are moist prior to burnout
3. Remove glaze from top of investment
4. Balance casting arm, if necessary
5. Place casting rings in back and center of furnace with orientation dot to the right
6. Program furnace per manufacturer's instructions and ensure complete burnout
7. Ensure proper cradle is in place
8. Place appropriate crucible in machine
9. Wind broken-arm casting machine
10. Preheat crucible using furnace or torch
11. Ensure at least 50 percent new alloy is added to recycled alloy
12. Place alloy in crucible and melt using torch
13. Apply casting flux, if required
14. Remove casting ring from furnace and place in cradle
15. Release broken arm mechanism when metal reaches proper temperature
16. Remove casting ring after arm completely stops spinning
17. Cool ring IAW alloy manufacturer's instructions
18. Divest and deoxidize castings using air abrasive unit
19. Inspect casting for completeness

MODULE 7. CASTING FIXED RESTORATIONS

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

CASTING FIXED RESTORATIONS

DID THE TRAINEE…?	YES	NO
1. Prepare mold for burnout and balance the casting machine		
2. Set and load the burnout furnace correctly		
3. Ensure molds were burned out completely		
4. Cast restorations with properly adjusted casting torch		
5. Adhere to all safety precautions while operating casting machine and torch		
6. Divest and deoxidize castings without damage		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 8. FINISHING AND POLISHING FIXED RESTORATIONS

STS TASK REFERENCE(S):

4f(7)	Fit castings to dies
4h(4)	Fit metal-ceramic castings to dies
4h(5)	Restore occlusion of restorations
4f(11)	Finish and polish restorations

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*

EVALUATION INSTRUCTIONS:

Demonstrate how to finish and polish fixed restorations. Describe what the trainee should look for on the interior (intaglio) surface of the casting using a microscope. Stress the importance of margins, contacts, contours, and occlusion of the restorations. Have the trainee finish and polish fixed restorations and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Articulating Paper
Finishing and Polishing Burs, Points, and Wheels
Heatless Stone
Microscope
Separating Disk
Soap
Buffing Bar Compound (BBC)
Handpiece or Lathe
Indicating Medium
Rouge
Shimstock
Steam or Ultrasonic Cleaner

STEPS IN TASK PERFORMANCE:

1. Inspect castings for completeness
2. Inspect internal (intaglio) surface of castings under magnification for nodules, voids, and residual investment
3. Remove positive defects using a bur
4. Apply disclosing medium to identify interferences on the intaglio surface of crown
5. Carefully seat castings on dies and evaluate fit, do not abrade the die
6. Inspect interior of castings for high spots
7. Grind indicated high spot areas
8. Repeat fitting process until castings are fully seated
9. Confirm accuracy of margins
10. Gently clean disclosing medium from die using soft brush, soap, and water
11. Clean indicating medium from casting using steam cleaner
12. Desprue castings using separating disk, avoiding cutting into crown
13. Contour sprue stump using heatless stone or bur
14. Seat restorations on working cast
15. Adjust proximal contacts independently using articulating paper, stones, and rubber wheels
16. Repeat adjusting proximal contacts until restorations seat on solid cast
17. Verify proximal contacts with shimstock
18. Adjust centric and eccentric occlusion of restorations on working cast
19. Matte finish restorations using stones, avoiding previously adjusted areas
20. Rubber all restoration surfaces
21. Polish restorations using buffing bar compound (BBC) or equivalent, soft bristle brushes, and rag or felt wheel
22. Final polish restorations, using jewelers rouge, soft bristle brush, and rag or felt wheels
23. Clean restorations using steam or ultrasonic cleaner
24. Check proximal and occlusal contacts with shimstock
25. Check fit of casting to ensure accurate margins
26. Disinfect restoration

MODULE 8. FINISHING AND POLISHING FIXED RESTORATIONS

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to finish and polish fixed restorations and satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

FINISHING AND POLISHING FIXED RESTORATIONS

DID THE TRAINEE…?	YES	NO
1. Remove all nodules or defects on interior surface of castings prior to seating on die		
2. Disclose any high spots and accurately remove interferences during seating		
3. Properly fit the castings to the dies		
4. Adjust proximal contacts on restorations until shimstock slightly drags		
5. Restore occlusion to original VDO and eliminate eccentric interferences		
6. Maintain proper emergence profile and height of contour		
7. Finish and polish restorations to a high luster		
8. Maintain desired occlusal and proximal contacts		
9. Maintain margin integrity		
10. Clean and disinfect restorations		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 9. SOLDERING CROWNS

STS TASK REFERENCE(S):

4f(8) Solder crowns

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*
Manufacturer's instructions

EVALUATION INSTRUCTIONS:

Demonstrate how to prepare and solder a crown to add a proximal contact or repair a hole. Stress the importance of cleanliness of the solder area. Explain how to select the appropriate solder. Emphasize the importance of preheating the investment prior to soldering. Stress the importance of removing torch immediately after the solder "wets" the parent alloy. Have the trainee solder crowns and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Distilled Water
Flux
Handpiece
Platinum Foil
Soldering Investment
Spatula
Sticky wax
Striker
Torch with Soldering Tip
Tweezers
Bunsen Burner
Finishing and Polishing Burs, Points, and Wheels
Graduated Cylinder
Lathe
Solder
Soldering Stand
Sticky Wax
Mixing Bowl
Tongs
Deoxidizing Agent/Abrasive
Bard Parker
Burnout Furnace

STEPS IN TASK PERFORMANCE:

ADDING A PROXIMAL CONTACT

1. Prepare proximal area using clean rubber wheels and points
2. Confine the solder to the desired area with graphite or another anti-flux
3. Adjust Bunsen burner to maximize the temperature of the reducing portion of the flame
4. Select the solder and cut a piece larger than the contact area
5. Hold the crown with a pair of soldering tweezers
6. Warm the crown over the flame and apply flux
7. Dip the solder segment into the flux
8. Position the proximal surface horizontally and add the solder
9. Hold the crown with solder in the reducing zone of the flame
10. Heat the crown until it turns red and the solder begins to flow
11. Quench the crown

STEPS IN TASK PERFORMANCE:

REPAIRING A HOLE

1. Prepare area surrounding hole using clean rubber points
2. Confine the solder to the desired area with graphite or another anti-flux
3. Position platinum foil over the die
4. Seat the crown over the platinum foil on the die
5. Sticky wax platinum foil to crown through the hole
6. Remove crown with the platinum foil attached
7. Hand mix solder investment per manufacturer's directions
8. Place investment into crown
9. Invert crown onto investment patty
10. Ensure margins are embedded in solder patty
11. Preheat solder patty in 900 °F burnout furnace for 30 minutes
12. Remove patty from furnace and place on soldering stand
13. Apply flux and solder to solder area
14. Evenly heat crown using reducing portion of torch flame
15. Direct flame surrounding solder area
16. Quench the crown and patty
17. Divest and deoxidize crown
18. Remove platinum foil
19. Seat crown on die

MODULE 9. SOLDERING CROWNS

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to solder crowns and satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

SOLDERING CROWNS

DID THE TRAINEE…?	YES	NO
1. Prepare the solder area		
2. Invest the crown, covering all margins		
3. Select appropriate solder		
4. Apply flux and anti-flux		
5. Burnout invested crown to proper time/temperature		
6. Use reducing zone of flame		
7. Accurately solder a proximal contact or solder a hole		
8. Reseat crown on to die		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 10. SOLDERING FIXED PARTIAL DENTURES

STS TASK REFERENCE(S):

4f(9) Solder fixed partial dentures

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*
Manufacturer's instructions

EVALUATION INSTRUCTIONS:

Demonstrate how to prepare and solder a fixed partial denture (FPD). Explain how an accurate relationship between the units of a FPD is critical to the success of the soldering procedure. The relationship can be maintained in either of two ways; the stone index method, or the autopolymerizing resin method. This module describes the autopolymerizing resin method. Stress the importance of cleanliness of the solder joint area. Explain how to select the appropriate solder. Emphasize the importance of preheating the investment prior to soldering. Stress the importance of removing the torch immediately after the solder "wets" the parent alloy. Have the trainee solder FPDs and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate their abilities using the performance checklist.

PERFORMANCE RESOURCES:

Autopolymerizing Resin
Burnout Furnace
Distilled Water
Flux
Handpiece
Inlay wax
Polishing Compound
Soldering Investment
Spatula
Striker
Torch with Soldering Tip
Goggles
Bard Parker
Deoxidizing agent/abrasive
Finishing and Polishing Burs, Points, and Wheels
Graduated Cylinder
Lathe
Mixing Bowl
Solder
Soldering Stand
Sticky Wax
Tongs
Tweezers

STEPS IN TASK PERFORMANCE:

1. Seat retainers on solid cast and verify fit with a microscope
2. Select a solder with a melting range 100°F below that of the casting alloy
3. Adjust solder gap width to approximately 0.25 mm
4. Prepare a clean, satin finished solder joint using a rubber wheel
5. Sticky wax retainers to cast
6. Adjust a piece of solder of suitable size and shape to fit the solder gap
7. Fill solder joint area with acrylic resin
8. Apply resin to the occlusal surface and strengthen the relation with a bur (allow resin to polymerize)
9. Verify the fit on the solid cast
10. Hand mix solder investment per manufacturer's directions
11. Remove indexed pontic and retainers from cast as a unit
12. Place investment into retainers
13. Invert onto investment patty, covering margins but leaving the maximum amount of metal exposed for solder application
14. Allow solder patty to set up
15. Trim solder patty to a vertical thickness of 15-20 mm and a horizontal width of at least 3 mm from units; round edges of patty
16. Carve "V" shaped-channels into solder patty at solder joint areas
17. Ensure margins remain embedded in solder patty
18. Preheat solder assembly in 900 °F burnout furnace for 30 minutes
19. Remove assembly from furnace and place on soldering stand
20. Check that all resin is burned out
21. Apply flux and position solder in solder joint area
22. Evenly heat entire assembly using reducing zone of flame
23. Direct flame to units adjacent to solder area until units are dull red
24. Concentrate flame on solder gap area until solder flows
25. Bench cool FPD to room temperature; Do not quench
26. Divest and deoxidize FPD

MODULE 10. SOLDERING FIXED PARTIAL DENTURES

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to solder fixed partial dentures and satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

SOLDERING FIXED RESTORATIONS

DID THE TRAINEE…?	YES	NO
1. Prepare the solder joint area and seat the retainers completely on solid cast		
2. Invest the units covering all margins		
3. Trim patty width no less than 3 mm from units		
4. Trim patty depth to a range of 15-20 mm		
5. Carve a "V" notch at solder joint area		
6. Select appropriate solder		
7. Burnout invested units to proper time/temperature		
8. Accurately produce a solder joint which completely fills joint and is free of porosity		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 11. VENEERING METAL-RESIN RESTORATIONS

STS TASK REFERENCE(S):

4g Fabricate resin veneered crowns and fixed partial dentures

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*
Manufacturer's information

EVALUATION INSTRUCTIONS:

Demonstrate how to veneer metal-resin restorations. The Visio-Gem® and Rocatec® systems are one of many resin-veneering systems. Adapt this training module to allow you to evaluate and certify training on your own system. Consider both functional and esthetic requirements when demonstrating how to cut back the incisal, facial and proximal areas. Emphasize that all units must be clean and dry prior to the resin veneer application procedure. Emphasize the veneer surface must remain contaminant free. Have the trainee veneer metal-resin restorations and suggest ways to improve performance. After the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Air Hose
Burnout Oven
Alloy
Articulator, Semi-Adjustable
Casting Ring
Dental Instruments
Debubblizer
Inlay Wax
Electronic Scale
Gas/Air Torch
Investment
Rocatec System ®
Waxing Instruments
Millimeter Ruler
Polishing compound
Small Artist Brush
Sprue Former
Sticky Wax
Bench Lathe
Wax Gauge
Ultrasonic Cleaner
Articulating Paper
Base/Crucible Former
Bunsen Burner
Casting Machine
Casting Ring Liner
Distilled Water
Finishing and Polishing Burs, Points, and Wheels
Graduated Cylinder
Handpiece
Hygrobath
Metal Gauge
Pen/Pencil
Retention Beads
Ring liner
Shimstock
Spatula
Sprue Wax
Striker
Vac-U-Vestor W/ Bowl
Vibrator
Visio-Gem System ®

STEPS IN TASK PERFORMANCE:

1. Wax patterns to full contour
2. Scribe veneer outline on wax pattern
3. Cutback veneer area of patterns to minimum wax thickness
4. Carve undercut at metal-to-resin junction
5. Place retention beads on facial aspect of veneer substructure
6. Refine margins of wax patterns
7. Sprue, invest, burnout, cast, and divest castings
8. Seat castings on dies and working cast
9. Adjust contacts and contours and finish to rubber stage
10. Clean substructure using ultrasonic or steam cleaner
11. Sandblast with Rocatec-Pre for 10 seconds
12. Steam clean substructure surfaces
13. Blast substructures with Rocatec-Plus at 2.5 bar pressure for 13 seconds, producing a uniform black matte finish
14. Apply Rocatec-Sil (silane coupling agent) and air dry for 5 min.
15. Mix opaquer to creamy consistency and apply thin layer to substructures
16. Cure opaquer with Alpha light for 2-5 seconds
17. Layer dentine and incisal paste, blending middle and incisal thirds for proper shade
18. Slightly overbuild resin veneer to allow for finishing
19. Cure veneered substructures in Beta unit
20. Adjust proximal contacts
21. Seat restorations on cast and restore occlusion
22. Contour and finish veneers
23. Apply glaze and cure
24. Rubber metal areas to remove scratches
25. Polish resin and metal areas of restorations
26. Clean and disinfect restorations

MODULE 11. VENEERING METAL-RESIN RESTORATIONS

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to veneer metal-resin restorations and satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

VENEERING METAL-RESIN RESTORATIONS

DID THE TRAINEE…?	YES	NO
1. Wax restorations to full contour		
2. Cutback wax-up to prescribed depth and design		
3. Carve an undercut at metal-to-resin junction without damaging the wax margin		
4. Place retention beads on veneer surface, away from metal-to-resin junction		
5. Produce an accurate casting free of pits, voids, and defects		
6. Finish to rubber stage without compromising contacts, contours, or margins		
7. Build and blend resin veneer to desired shade		
8. Create veneer that duplicates natural tooth contours without metal show through		
9. Create a flush union at metal-to-resin junction		
10. Restore centric and eccentric occlusion desired in the case		
11. Polish restorations, creating a smooth and hygienic surface		
12. Clean and disinfect restorations		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 12. FINISHING METAL-CERAMIC RESTORATIONS

STS TASK REFERENCE(S):

4h(5) Restore occlusion of substructures
4h(6) Finish and prepare substructures for veneering

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*

EVALUATION INSTRUCTIONS:

Demonstrate how to finish metal-ceramic restorations. Emphasize the importance of checking metal thickness frequently and using ceramic bound stones. Explain how contamination degrades the porcelain-to-metal bond. Emphasize the importance of harmonizing the occlusal relationship between restorations and natural dentition. Have the trainee finish metal-ceramic restorations and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Articulating Paper
Ceramic Bound Stones
Finishing and Polishing Burs, Points, and Wheels
Handpiece or Lathe
Metal Gauge
Microscope
Separating Disk
Shimstock
Ultrasonic or Steam Cleaner

STEPS IN TASK PERFORMANCE:

1. Desprue substructure using separating disk
2. Seat restorations on dies and cast
3. Verify margins are closed using microscope
4. Recontour sprue stump
5. Adjust proximal contacts using articulating paper, rubber wheels, and stones
6. Verify proximal contacts with shim stock
7. Finish axial surfaces with stone; avoiding rubbered contacts
8. Adjust occlusion using articulating paper and stones
9. Verify occlusal contacts with shim stock
10. Adjust eccentric contacts
11. Remove any undesirable interferences using stones
12. Evaluate cutback design, ensuring proper porcelain placement
13. Measure metal thickness of porcelain-bearing areas
14. Reduce porcelain-bearing areas to minimum thickness, where required
15. Reduce width of metal collar to minimum
16. Sharpen finish lines
17. Produce satin finish on porcelain-bearing areas, in a single direction, using stones
18. Air abrade with aluminum oxide
19. Clean substructure

MODULE 12. FINISHING METAL-CERAMIC RESTORATIONS

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to finish metal-ceramic substructures and satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

FINISHING METAL-CERAMIC RESTORATIONS

DID THE TRAINEE…?	YES	NO
1. Desprue and recontour sprue stump to proper contours		
2. Seat crown, maintaining marginal integrity		
3. Adjust proximal contacts on restorations until shimstock slightly drags		
4. Maintain proper emergence profile and height of contour		
5. Restore occlusion to original VDO and verify contacts using shimstock		
6. Reduce porcelain bearing surfaces to proper thickness (0.2-0.3 mm where required)		
7. Create a porcelain bearing surface free of sharp angles, holes, and contaminants		
8. Create a sharp porcelain-metal junction; without damaging substructure		
9. Clean substructures		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 13. PRESOLDERING METAL-CERAMIC SUBSTRUCTURES

STS TASK REFERENCE(S):

4i(2) Presolder substructures

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*

EVALUATION INSTRUCTIONS:

Demonstrate how to presolder metal-ceramic substructures. Have the trainee presolder metal-ceramic substructures and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Air Abrasive Unit
Burs
Ceramic Bound Stones
Furnace or Oven
Hemostats
Oxygen Torch with Soldering Tip
Solder
Soldering Stand
Steam or Ultrasonic Cleaner
Striker
Tongs

STEPS IN TASK PERFORMANCE:

1. Place invested assembly in cold furnace and raise to 1300°F and heat soak for 5 to 10 minutes
2. Ensure the torch has a special soldering tip
3. Adjust the flame until the inner cone is about 15 mm long, there should be little or no hissing
4. Remove assembly from oven and place on soldering stand
5. Immediately apply flame to base of investment, evenly heating entire assembly
6. Apply flame to the castings and heat until they show a slight orange color
7. Maintain the torch tip in the localized solder joint
8. Place the end of the solder strip onto the solder joint area
9. Ensure the solder melts and flows down into the joint area
10. Remove the solder strip, but keep a brush flame on the assembly
11. Move the flame to the reverse side and draw the solder through the joint
12. Let the investment and substructure bench cool to room temperature
13. Divest and clean substructure using air abrasive unit
14. Grind solder area to desired contour using stones
15. Fit substructure on cast and adjust occlusion

MODULE 13. PRESOLDERING METAL-CERAMIC SUBSTRUCTURES

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

PRESOLDERING METAL-CERAMIC SUBSTRUCTURES

DID THE TRAINEE…?	YES	NO
1. Burnout the investment assembly using correct time and temperature		
2. Adjust the soldering torch and heat the investment patty evenly		
3. Accurately produce a solder joint which completely fills the joint and is free of porosity		
4. Divest without abrading or damaging substructure		
5. Finish solder area to desired contour		
6. Verify fit of substructure on cast		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 14. OPAQUING METAL-CERAMIC SUBSTRUCTURES

STS TASK REFERENCE(S):

4h(7) Oxidize prepared castings
4h(8) Apply opaque porcelain

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*

EVALUATION INSTRUCTIONS:

Demonstrate how to oxidize and opaque metal-ceramic substructures. Emphasize that each substructure alloy requires specific handling procedures. Stress the importance of selecting a porcelain that is compatible with the underlying substructure. Have the trainee oxidize and opaque metal-ceramic substructures and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Air Abrasive Unit
Distilled Water
Facial Tissue
Glass Slab and Rod
Hemostats
Opaque Liquid
Opaque Modifier
Opaque Porcelain
Porcelain Furnace
Porcelain Instrument Kit
Sagger Tray
Sponge
Steam or Ultrasonic Cleaner
Tongs

STEPS IN TASK PERFORMANCE:

1. Grasp substructure with hemostats
2. Air abrade substructure to remove contaminants
3. Clean substructure using steam or ultrasonic cleaner and let dry
4. Place substructure on sagger tray using hemostats
5. Place sagger tray on furnace firing tray/stand using tongs
6. Oxidize substructure IAW alloy manufacturer's instructions
7. Remove substructure from furnace using tongs
8. Remove excess surface oxides IAW alloy manufacturer’s directions, if required
9. Wet porcelain bearing surface of substructure with opaque liquid
10. Mix opaque liquid and opaque porcelain for washcoat application
11. Apply washcoat layer of opaque on porcelain bearing surface
12. Fire opaque in furnace IAW porcelain manufacturer’s instructions
13. Remove substructure from furnace and let cool to room temperature
14. Mix opaque liquid and opaque porcelain to creamy consistency
15. Apply second layer of opaque, using glass rod or porcelain brush
16. Cover all porcelain bearing surfaces leaving no metal shadows
17. Dry opaque and place substructure on sagger tray
18. Fire in furnace IAW porcelain manufacturer’s instructions
19. Remove substructure from furnace using tongs
20. Ensure there are no visible gray shadows
21. Repeat opaque application and firing, if required, to correct gray shadows
22. Apply opaque modifiers, if requested
23. Examine opaque for visible cracks/defects
24. Ensure opaque thickness does not exceed 0.2 mm
25. Ensure opaque has an eggshell-like surface texture

MODULE 14. OPAQUING METAL-CERAMIC SUBSTRUCTURES

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to opaque metal-ceramic substructures and satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

OPAQUING METAL-CERAMIC SUBSTRUCTURES

DID THE TRAINEE…?	YES	NO
1. Oxidize the substructure without distortion or damage		
2. Deoxidize substructure to a uniform layer IAW alloy manufacturer's direction		
3. Properly clean substructure prior to opaque application		
4. Apply opaque that uniformly masks metal without washing over finish line		
5. Attain an opaque layer free of visible cracks or defects with an eggshell-like surface		
6. Produce opaque layer that does not exceed 0.2 mm in thickness		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 15. BUILDING PORCELAIN TO ANATOMICAL FORM

STS TASK REFERENCE(S):

4h(9) Apply shoulder porcelain
4h(10) Apply dentine and enamel porcelain

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*

EVALUATION INSTRUCTIONS:

Demonstrate how to fabricate porcelain labial margins and build porcelain to anatomical form. Ensure the die has been properly prepared ready for porcelain application. Stress the importance of having the dentine porcelain slightly moist to prevent entrapment of air bubbles between the dentine and enamel layers. Have the trainee fabricate porcelain labial margins and build porcelain to anatomical form and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Dentine and Enamel Porcelains
Facial Tissue
Handpiece
Hemostats
Microscope
Porcelain Furnace
Porcelain Instrument Kit
Sagger Tray
Wax Pencil (Red & Blue)
Distilled Water
Glass Slab and Rod
Bench Lathe
Margin Porcelain
Modeling Fluid
Porcelain Separator
Porcelain Finishing Accessories
Tongs
Porcelain Brushes

STEPS IN TASK PERFORMANCE:

1. Apply porcelain separator to master die and seat substructures
2. Mix margin porcelain to paste-like consistency on glass slab
3. Apply margin porcelain to cervical area using porcelain brush
4. Condense porcelain by gently vibrating die; tap or serrate
5. Blot excess moisture from margin porcelain using facial tissue
6. Smooth porcelain towards margin using whipping brush
7. Remove excess moisture and overextensions
8. Press on substructure in a downward motion and remove with margin intact
9. Place substructure on sagger tray and fire IAW porcelain manufacturer's instructions
10. Remove substructure from furnace and let cool to room temperature
11. Using microscope, inspect inside of substructure for porcelain particles and remove them
12. Mark facial margin on die using wax pencil and reapply porcelain separator
13. Replace substructure on die and repeat porcelain margin application procedure to correct discrepancies
14. Remove substructure from die with porcelain margin intact
15. Place substructure on sagger tray and fire IAW porcelain manufacturer's instructions
16. Remove substructure from furnace and let cool to room temperature
17. Finish porcelain margin using diamonds, stones, etc.
18. Mix dentine porcelain
19. Apply dentine porcelain in small increments to surface of restorations
20. Slightly overbuild contours of tooth with dentine porcelain
21. Condense porcelain buildup using facial tissue
22. Ensure porcelain buildup is kept moist throughout entire application procedure
23. Cutback dentine porcelain buildup for enamel porcelain
24. Moisten cutback area before adding enamel porcelain to ensure proper dentine/enamel blend
25. Mix and apply enamel porcelain in small increments to cutback areas
26. Slightly overbuild contours of tooth with enamel porcelain
27. Blot restorations periodically with facial tissue and remove restorations from cast
28. Attach hemostats to restorations
29. Add dentine or enamel porcelain to interproximal contact areas, as needed
30. Condense porcelain buildup slightly by alternating vibration and tissue blotting
31. Place restorations on sagger tray and fire IAW porcelain manufacturer's instructions
32. Remove restorations from furnace and let cool to room temperature

MODULE 15. BUILDING PORCELAIN TO ANATOMICAL FORM

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to fabricate porcelain labial margins and build porcelain to anatomical form. The trainee must satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

BUILDING PORCELAIN TO ANATOMICAL FORM

DID THE TRAINEE…?	YES	NO
1. Verify the accuracy margins		
2. Apply separating medium to die before applying margin porcelain		
3. Fabricate an accurate porcelain margin		
4. Remove all porcelain particles from inside the restorations		
5. Build dentine porcelain to proper contours and occlusion		
6. Cutback dentine buildup and apply enamel porcelain IAW with shade requested		
7. Add sufficient dentine and enamel porcelains to all contact areas to allow for shrinkage		
8. Dry buildup and fire porcelain to maturity		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 16. FIRING PORCELAIN RESTORATIONS

STS TASK REFERENCE(S):

4h(12) Fire porcelain buildups

TRAINING REFERENCE(S):

Manufacturer's directions

EVALUATION INSTRUCTIONS:

Demonstrate how to fire porcelain restorations IAW manufacturer's directions. Stress the importance of drying the porcelain buildup prior to placing restoration in the furnace. Have the trainee fire porcelain restorations and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Hemostat
Porcelain furnace
Serrated Instrument
Tongs
Porcelain
Sagger Tray
Tissue

STEPS IN TASK PERFORMANCE:

1. Ensure porcelain applications are complete
2. Inspect the underside of the metal framework and remove loose particles of porcelain
3. Carefully place the restoration on sagger tray
4. Properly place the restoration on firing table of the porcelain furnace
5. Ensure the correct firing program is entered for firing sequence
6. Allow the fired porcelain to cool before removing from firing table
7. Inspect the restoration to verify complete firing has occurred

MODULE 16. FIRING PORCELAIN RESTORATIONS

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to fire porcelain buildups to achieve maturation. The trainee must satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

FIRING PORCELAIN RESTORATIONS

DID THE TRAINEE…?	YES	NO
1. Remove any loose porcelain from the underside of the framework		
2. Place the restoration on the sagger tray, ensuring margins and pontic areas are not touching the tray		
3. Ensure that the correct program was used to fire the porcelain		
4. Allow the restoration to cool before removing from the firing tray		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 17. CONTOURING METAL-CERAMIC RESTORATIONS

STS TASK REFERENCE(S):

4h(13) Contour fired porcelain

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*

EVALUATION INSTRUCTIONS:

Demonstrate how to contour metal-ceramic restorations. Stress the importance of inspecting the internal surfaces of the crown for sintered porcelain particles. Ensure the trainee follows the line angles and characterization of the patients natural dentition when contouring restorations. Have the trainee contour metal-ceramic restorations and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Air Abrasive Unit
Ceramic Bound Stones
Diamond Wheels
Disks
Metal Gauge
Shimstock
Articulating Paper
Diamond Burs
Disclosing Medium
Handpiece
Microscope
Wax Pencil (Red and Blue)

STEPS IN TASK PERFORMANCE:

1. Verify fit of restorations on dies
2. Adjust proximal and ridge contacts of restorations using articulating paper
3. Ensure restorations seat on a solid cast and verify contacts using shimstock
4. Adjust centric and eccentric occlusal contacts to desired occlusal scheme
5. Reduce bulk to establish overall contour, i.e. length, width, and thickness
6. Adjust length to harmonize with both centric and eccentric contacts
7. Contour facial surface, frequently checking the thickness of the veneer
8. Shape the interproximal of FPDs, using ultrathin discs, to produce natural embrasures
9. Contour proximal surfaces to shape embrasures and imitate contours of teeth on the contralateral side
10. Check facial profile and alignment of teeth
11. Mark line angles of restorations and natural dentition to use as guides in contouring
12. Contour veneer surfaces so all line angles match teeth on the contralateral side
13. Carve anatomy, i.e. developmental grooves and secondary anatomy
14. Carve surface detail and texture veneer to match adjacent teeth

MODULE 17. CONTOURING METAL-CERAMIC RESTORATIONS

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to demonstrate how to contour a metal-ceramic fixed partial denture, reproducing the patient's existing natural dentition. The trainee must satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

CONTOURING METAL-CERAMIC RESTORATIONS

DID THE TRAINEE…?	YES	NO
1. Correctly seat the fired restorations without damaging the die		
2. Adjust proximal, occlusal, and ridge contacts and verify using shimstock		
3. Adjust lengths to prescribed centric and eccentric occlusion		
4. Develop facial, lingual, proximal, and emergence profile contours to compliment natural dentition		
5. Contour restorations to harmonize with existing natural dentition		
6. Create surface texture to match adjacent natural dentition		

FEEDBACK:

The trainee must be able to contour a porcelain fused to metal fixed partial denture. Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 18. STAINING AND GLAZING METAL-CERAMIC RESTORATIONS

STS TASK REFERENCE(S):

4h(14) Surface stain and color correct veneers
4h(15) Glaze porcelain restorations

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*
Manufacturer's instructions

EVALUATION INSTRUCTIONS:

Demonstrate how to stain and glaze metal-ceramic restorations. Explain how the color wheel applies to staining when small adjustments are needed to produce the correct shade. Have the trainee stain and glaze metal-ceramic restorations and suggest ways to improve performance. Explain how the final surface texture appearance is influenced by both firing time and temperature. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Air Abrasive Unit
Hemostats
Porcelain Staining Medium
Shade Guide
Staining Kit
Staining Palate
Water
Disinfectant Solution
Porcelain Furnace
Sagger Tray
Small Artist Brushes
Staining Liquid
Steam or Ultrasonic Cleaner
Tongs

STEPS IN TASK PERFORMANCE:

1. If a try-in was accomplished, disinfect restorations *before* staining
2. Break glazed porcelain surface using air abrasive unit
3. Accentuate surface texture to offset application of stain
4. Clean restorations using steam or ultrasonic cleaner
5. Mix stain with appropriate staining liquid to a thin, fluid consistency
6. Hold restorations with hemostat and apply stain with small artist brush
7. Verify that the color matches the requested shade
8. Dry restorations under warm muffle
9. Remove excess stain from metal areas
10. Place restorations on sagger tray and fire IAW porcelain manufacturer's instructions
11. Remove sagger tray from furnace and bench cool restorations to room temperature
12. Inspect restorations for desired color match and proper glaze
13. If color match is not achieved, reaccomplish complete procedure

MODULE 18. STAINING AND GLAZING METAL-CERAMIC RESTORATIONS

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to accurately match the patients natural tooth color by applying stain to the surface of the porcelain. The trainee must satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

STAINING AND GLAZING METAL-CERAMIC RESTORATIONS

DID THE TRAINEE…?	YES	NO
1. Disinfect the restoration, if necessary, prior to applying the stain		
2. Properly prepare and clean the porcelain surface		
3. Achieve correct match using stains provided in the stain kit		
4. Allow the stain medium to completely dry before placing it in the furnace		
5. Verify that the correct program was used to fire the porcelain		
6. Achieve desired color match, glaze, and surface texture		

FEEDBACK:

The trainee must be able to apply stain to a porcelain fused to metal fixed partial denture producing a match with the patient's natural dentition. The trainee must also be able to understand the firing procedures required to ensure complete maturation has occurred. Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 19. POSTSOLDERING METAL-CERAMIC RESTORATIONS

STS TASK REFERENCE(S):

4i(3) Postsolder metal-ceramic restorations

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*

EVALUATION INSTRUCTIONS:

Demonstrate how to postsolder metal-ceramic restorations. Ensure that antiflux is used to confine the solder to the joint area. Have the trainee postsolder metal-ceramic restorations and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Anti-Flux
Bunsen Burner
Bur
Electronic Scale
Furnace or Burnout Oven
Hemostats
Mixing Cup
Soldering Investment
Finishing and Polishing Burs, Points and Wheels
Boxing Wax
Distilled Water
Flux
Handpiece or Lathe
Ivory Wax
Solder
Spatula
Sticky Wax

STEPS IN TASK PERFORMANCE:

1. Prepare solder joint and establish solder relationship
2. Apply ivory wax to porcelain areas of restoration to prevent contact with soldering investment
3. Fabricate solder patty to 15-20 mm vertical thickness and at least 3 mm horizontal width from units
4. Carve V-shaped notches into set investment patty
5. Boil out ivory wax
6. Clean exposed solder areas
7. Add flux to solder joint area
8. Apply antiflux to appropriate areas
9. Place solder in solder gap from lingual to facial
10. Place solder assembly in oven
11. Raise temperature gradually until fusion point of solder is reached
12. Remove solder assembly from oven
13. Divest and clean restoration
14. Contour solder joint areas and polish restoration with appropriate polishing compound
15. Clean and disinfect restoration

MODULE 19. POSTSOLDERING METAL-CERAMIC RESTORATIONS

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to post solder a metal-ceramic restoration. The trainee must satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

POSTSOLDERING METAL-CERAMIC RESTORATIONS

DID THE TRAINEE…?	YES	NO
1. Adequately apply wax to porcelain bearing surfaces to prevent contact with soldering investment		
2. Properly mix the soldering investment and invest the restorations		
3. Prepare the assembly by removing the wax and carving a V-shaped notch		
4. Position the solder in the joint area and place the assembly in the furnace		
5. Solder the units in a controlled environment using the furnace		
6. Divest and clean restorations		
7. Check fit of restoration on cast		
8. Contour solder joint areas and polish the restorations		
9. Clean and disinfect the restoration		

FEEDBACK:

The trainee must be able to accurately perform postsoldering procedures on a metal-ceramic restoration. Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 20. FABRICATING METAL-CERAMIC FIXED PARTIAL DENTURES

STS TASK REFERENCE(S):

4i(1) Fabricate metal-ceramic fixed partial dentures

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*

EVALUATION INSTRUCTIONS:

Demonstrate waxing the restoration to full contour. Stress proper anatomic form and occlusal contacts. Ensure trainee understands and follows appropriate manufacturer's directions. Have the trainee fabricate metal-ceramic fixed partial dentures and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Air Abrasive Unit
Alloy
Assorted Burs/Stones
Burnout Furnace
Casting Rings
Dental Porcelain
Finishing and Polishing Burs, Points, and Wheels
Handpiece
Inlay Wax
Microscope
Porcelain Furnace
Ring liner
Soft Bristle Brushes
Sprue Wax
Wax Gauge
Articulator
Electronic Scale
Bunsen Burner
Casting Investment
Dental Instruments
Die Spacer/Hardener
Gas/Oxygen Torch
Debubblizer
Metal Gauge
Polishing Compound
Separating Medium
Rubber Dam
Sprue Base
Vibrator
Wax Powder

STEPS IN TASK PERFORMANCE:

1. Inspect die preparation for undercuts and adequate reduction
2. Blockout undercuts, mark margins, and apply die hardener/spacer
3. Apply separating medium to die and adjacent/opposing teeth
4. Apply hot inlay wax to die to form coping
5. Remove wax pattern and inspect internal surface for voids
6. Replace wax pattern on die and reseal with inlay wax
7. Place wax pattern on cast and reduce any occlusal interferences
8. Apply wax to form lower 2/3 tooth contour of abutments and pontic
9. Wax occlusal morphology IAW procedures outlined in Module 3
10. Apply wax powder to occlusal of pattern and check for prescribed occlusal contacts
11. Apply inlay wax to fill in deficient contours, smooth and refine entire pattern
12. Draw cutback design on pattern using carving instrument
13. Cutback porcelain bearing areas IAW procedures outlined in Module 5
14. Apply wax to margins and refine marginal adaptation using microscope
15. Determine required size of sprue leads
16. Construct runner bar assembly using sprue wax or preformed patterns
17. Sticky-wax sprue leads the pattern at 45-degree angle
18. Seal sprue leads to runner bar using inlay wax
19. Sticky-wax feeder sprue leads to sprue base
20. Seal sprue leads to sprue base using inlay wax
21. Remove pattern from die and weigh IAW guidelines stated in Module 6
22. Invest, burnout and cast the pattern IAW procedures outlined in Modules 6 and 7
23. Desprue substructure and seat substructure on removable dies
24. Finish the substructure IAW procedures outlined in Module 11
25. Grasp substructure with hemostats and blast in air abrasive unit
26. Remove residue using steam or ultrasonic cleaner
27. Place substructure on sagger tray and fire substructure IAW alloy manufacturer's instructions
28. Repeat air abrasive unit and cleaning, if required by manufacturer
29. Apply and fire opaque porcelain IAW procedures outlined in Module 13
30. Apply and fire dentine and enamel porcelain IAW procedures outlined in Modules 14 and 15
31. Contour the fired restoration IAW procedures outlined in Module 16
32. Reapply, fire and contour porcelain correction
33. Apply stains and glaze the restoration IAW procedures outlined in Module 17
34. Polish the non-porcelain bearing surfaces IAW procedures outlined in Module 8
35. Clean and disinfect the finished restoration

MODULE 20. FABRICATING METAL-CERAMIC FIXED PARTIAL DENTURES

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to fabricate metal-ceramic fixed partial dentures and satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

FABRICATING METAL-CERAMIC FIXED PARTIAL DENTURES

DID THE TRAINEE…?	YES	NO
1. Inspect the casts and mounting to ensure adequate reduction		
2. Wax the pattern to full contour, establishing proper anatomic form and occlusion		
3. Cut back the wax-up, providing adequate space for the porcelain veneer		
4. Sprue the wax pattern using the indirect technique		
5. Invest, burnout and cast the substructure IAW manufacturer's directions		
6. Recover and finish the substructure to a satin finish on the porcelain bearing areas		
7. Oxidize the substructure IAW alloy manufacturer's instructions		
8. Apply and fire opaque porcelain, ensuring complete coverage of the underlying metal		
9. Apply dentine and enamel porcelain to anatomic form and fire IAW manufacturer's directions		
10. Contour the fired porcelain, reproducing the anatomic features of the surrounding dentition		
11. Color correct restoration to match prescribed shade and fire to a glaze		
12. Polish the non-porcelain bearing surfaces to a high luster		
13. Clean and disinfect the restoration		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 21. FABRICATING SURVEYED CROWNS

STS TASK REFERENCE(S):

4j Fabricate surveyed crowns

TRAINING REFERENCE(S):

AFP 162-6, Vol. 2, *Dental Laboratory Technology*

EVALUATION INSTRUCTIONS:

Demonstrate how to fabricate surveyed crowns. Ensure you have a tripoded design cast prior to waxing the pattern or have the dentist establish the survey table tilt. Ensure trainee understands and follows appropriate manufacturer's directions. Have the trainee fabricate survey crowns and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Air Abrasive Unit
Articulator
Bunsen Burner
Burnout Furnace
Casting Rings
Dental Instruments
Dental Surveyor
Die Hardener/Spacer
Finishing and Polishing Burs, Points, and Wheels
Casting Torch
Handpiece
Investment
Inlay Wax
Polishing Compound
Microscope
Separating Medium
Rubber Dam
Sprue Base
Soft Bristle Brushes
Survey Table W/Instruments
Sprue Wax
Vibrator
Undercut Gauge
Wax Powder
Wax Pencil (Red & Blue)

STEPS IN TASK PERFORMANCE:

1. Inspect die preparation for undercuts or distorted areas
2. Block out any undercuts, mark margins and apply die hardener/spacer
3. Check bite for adequate reduction
4. Apply separating medium to pattern area and opposing teeth
5. Apply hot inlay wax to die to form coping
6. Remove wax pattern and inspect internal surface for voids
7. Replace wax pattern on die and reseal with inlay wax
8. Place wax pattern on articulator and reduce any occlusal interferences
9. Apply wax to form lower 2/3 tooth contour of abutments and pontic
10. Wax occlusal morphology IAW procedures outlined in Module 3
11. Apply wax powder to occlusal of pattern and check for prescribed contact pattern
12. Apply inlay wax to fill in deficient contours, smooth and refine entire pattern
13. Remove master cast and position on survey table
14. Adjust survey table to prescribed tilt using tripod marks
15. Lock table in place to maintain established tilt
16. Use undercut gauge to determine the location of the desired undercut, per the dentist's instructions
17. Carve guide planes at required locations
18. Adjust contours to ensure survey lines are compatible with proposed clasp assemblies
19. Carve rests in prescribed locations
20. Smooth and refine entire pattern
21. Sprue, invest, burnout and cast IAW procedures outlined in Modules 6 and 7
22. Finish and polish the restoration ensuring all previously established features are unaltered
23. Clean and disinfect the finished restoration

MODULE 21. FABRICATING SURVEYED CROWNS

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to fabricate survey crowns and satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

FABRICATING SURVEYED CROWNS

DID THE TRAINEE…?	YES	NO
1. Inspect the casts and mounting to ensure adequate reduction		
2. Wax pattern to full contour, establishing proper anatomic form and occlusion		
3. Place the cast on survey table, establishing the prescribed path of insertion		
4. Establish survey lines and retentive undercuts in appropriate locations for proposed clasp assemblies		
5. Place guide planes and rests in prescribed locations		
6. Sprue, invest, burnout and cast IAW manufacturer's directions		
7. Finish and polish the restoration without altering the previously established axial contours		
8. Clean and disinfect the finished restoration		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 22. FABRICATING FIXED RESTORATIONS USING NON-RIGID CONNECTORS

STS TASK REFERENCE(S):

4k Fabricate fixed restorations using non-rigid connectors

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*
Manufacturer's instructions

EVALUATION INSTRUCTIONS:

Demonstrate how to fabricate fixed restorations using non-rigid connectors. Explain purpose of nonridgid connectors. Elaborate how and why each type of connector is used. Stress caution when investing the attachment pattern to avoid trapping air. Have the trainee fabricate fixed partial dentures with non-rigid connectors and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Air Abrasive Unit
Articulator
Bunsen Burner
Burnout Furnace
Casting Rings
Dental Instruments
Dental Surveyor
Die Hardener/Spacer
Finishing and Polishing Burs, Points, and Wheels
Casting Torch
Inlay Wax
Investment
Microscope
Polishing Compound
Plastic Non-Rigid connector patterns
Handpiece
Rubber Dam
Separating Medium
Soft Bristle Brushes
Sprue Base
Sprue Wax
Survey Table W/Instruments
Undercut Gauge
Vibrator
Wax Pencil (Red & Blue)
Wax Powder

STEPS IN TASK PERFORMANCE:

1. Inspect master cast and removable die for accuracy
2. Wax fixed partial denture pattern IAW procedures outlined in Module 3
3. Cut recess in distal wall of anterior abutment of wax-up to accommodate female attachment
4. Place cast on survey table and adjust tilt to place attachment parallel with distal abutment using surveyor
5. Use surveyor, with male connector attached, to wax female attachment into recessed area of wax pattern
6. Fill recess area around attachment with inlay wax
7. Recontour restoration using preferred dental instrument
8. Sprue, invest, burnout and cast pattern IAW manufacturer's instructions or Module 6 and 7
9. Recover and seat casting on die using microscope
10. Adjust proximal contact using articulating paper, stones and rubber wheels
11. Cut recess in mesial wall of pontic to accommodate male attachment using waxing instrument
12. Position male attachment into female attachment and sticky wax to distal retainer
13. Smooth area around male attachment with inlay wax
14. Recontour restoration using preferred dental instrument
15. Sprue, invest, burnout and cast pattern IAW manufacturer's instructions or Module 6 and 7
16. Seat recovered casting on die using microscope
17. Adjust proximal contacts using articulating paper, stones and rubber wheels
18. Seat male attachment to female attachment
19. Finish and polish the castings IAW the procedures outlined in Module 8
20. Clean and disinfect finished restoration

MODULE 22. FABRICATING FIXED RESTORATIONS USING NON-RIGID CONNECTORS

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to fabricate fixed restorations using non-rigid connectors and satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

FABRICATING FIXED RESTORATIONS USING NON-RIGID CONNECTORS

DID THE TRAINEE…?	YES	NO
1. Inspect the cast and die for accuracy, and properly prepare die for waxing		
2. Wax the FPD to full contour, ensuring proper contours and occlusion		
3. Place the female portion of the attachment in the distal wall of the mesial retainer, ensuring the path of insertion matched the distal retainer		
4. Invest and cast the pattern without trapping air in the attachment		
5. Accurately seat the mesial retainer on the die		
6. Place male attachment in female attachment and complete distal wax-up		
7. Invest and cast the pattern without trapping air in the attachment		
8. Accurately seat casting, ensuring non-frictional seating of the attachment		
9. Finish and polish the FPD without damaging the attachments		
10. Clean and disinfect the completed FPD		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 23. FABRICATING RESIN-BONDED FIXED PARTIAL DENTURES

STS TASK REFERENCE(S):

4l Fabricate resin-bonded fixed partial dentures

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*

EVALUATION INSTRUCTIONS:

Demonstrate how to fabricate resin-bonded fixed partial dentures. Stress the importance of reestablishing marginal integrity before beginning spruing and investing procedures. Ensure the mold has completely cooled before handling. Stress that care be taken when seating the casting so as not to damage the cast. Ensure adequate clearance for porcelain is achieved by checking the restoration on the mounting. Ensure the restoration is disinfected before the provider receives it for a bisque bake try-in. Place the restoration in a labeled plastic bag, identifying the restoration as etched. Have the trainee fabricate resin-bonded fixed partial dentures and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

Air Abrasive Unit
Articulator
Bunsen Burner
Burnout Furnace
Cast Trimmer
Casting Alloy
Casting Rings
Casting Torch
Debubblizer
Preweighed Dental Stone
Die Hardener/Spacer
Etching Solution
Finishing and Polishing Burs, Points, and Wheels
Handpiece
Inlay Wax
Investment
Microscope
Polishing Compound
Porcelains
Rubber Dam
Separating Medium
Soft Bristle Brushes
Spatula
Sprue Base
Sprue Wax
Tongs
Vacuum Mixer
Vacuum Mixing Bowl
Vibrator
Wax Pencil (Red & Blue)
Wax Powder
Waxing and Carving Instruments

STEPS IN TASK PERFORMANCE:

1. Fabricate a fixed master cast
2. Verify the accuracy of the mounting
3. Mark margins on master cast using wax pencil
4. Apply separating medium to the cast
5. Soften inlay wax and fill in margin areas
6. Wax up pontic and retentive wings to full contour
7. Remove the wax up from the preparation to verify path of insertion
8. Check the underside of the retentive wings for worm trails
9. Reseal the pattern to the cast and perform cut back procedures
10. Check occlusal clearance between the pontic and opposing teeth for adequate reduction
11. Perform final wax up to re-establish the marginal integrity
12. Sprue the pattern to ensure even flow of the molten metal IAW Module 6
13. Invest the pattern in high heat investment without ring liner
14. Burnout and cast the pattern IAW Module 7
15. Recover and de-sprue the casting
16. Check the casting for irregularities
17. Seat the casting on the master cast
18. Prepare the casting to receive porcelain
19. Deoxidize the casting
20. Blast the framework to remove excess oxides
21. Apply opaque porcelain with modifiers if used and fire
22. Apply dentine and enamel porcelains and fire
23. Contour fired porcelain to desired outcome
24. Return restoration to provider for initial try-in (if requested)
25. Prepare the porcelain for staining and glazing procedures
26. Apply stain and glaze medium (if necessary) and fire
27. Finish and polish the restoration
28. Prepare the restoration for etching procedures
29. Apply etching solution IAW manufacturer’s directions
30. Place the etched appliance in a plastic bag with appropriate identification

MODULE 23. FABRICATING RESIN-BONDED FIXED PARTIAL DENTURES

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to accurately fabricate a resin bonded fixed partial denture. The trainee must satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

FABRICATING RESIN-BONDED FIXED PARTIAL DENTURES

DID THE TRAINEE…?	YES	NO
1. Verify the accuracy of the working cast, ensuring adequate reduction and marginal integrity		
2. Wax up substructure ensuring proper design for porcelain application and accurate marginal adaptation		
3. Sprue, invest, burnout, and cast IAW manufacturer's directions		
4. Recover and seat the casting on the working cast without causing damage		
5. Finish and deoxidize the casting to prepare for porcelain application		
6. Apply opaque dentine and enamel porcelains to framework and fire IAW manufacturer's directions		
7. Contour the fired porcelain, achieving anatomical contours and proper occlusion		
8. Disinfect the restoration and return it to the provider if requested		
9. Apply and fire stain and glaze to match the patients natural dentition		
10. Finish and polish the restoration		
11. Etch the restoration IAW manufacturer's directions and place it in clean plastic bag		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

MODULE 24. FABRICATING PORCELAIN LAMINATE VENEERS

STS TASK REFERENCE(S):

4m(1) Fabricate porcelain laminate veneers

TRAINING REFERENCE(S):

AFP 162-6, Vol. 3, *Dental Laboratory Technology*

EVALUATION INSTRUCTIONS:

Demonstrate how to fabricate porcelain laminate veneers. Stress caution to avoid breaking the veneer. Stress safety when handling the porcelain etching and silane coupling agent. Have the trainee fabricate porcelain veneers and suggest ways to improve performance. After ensuring the trainee has received sufficient practice, evaluate his/her abilities using the performance checklist.

PERFORMANCE RESOURCES:

#8 Bur
Assorted Stones/Diamonds
Dental Instruments
Die Spacer
Vacuum Mixer
Microscope
Polyvinyl Siloxane Impression Material
Porcelain Etching Gel
Refractory Die Material
Steam or Ultrasonic Cleaner
Air Abrasive Unit
Blockout Wax
Dental Porcelain
Disclosing Medium
Handpiece
Pencil (Red and Blue)
Porcelain Brushes
Porcelain Furnace
Silane Coupling Agent
Tongs

STEPS IN TASK PERFORMANCE:

1. Inspect master cast for accuracy
2. Block out undercuts and apply die spacer to veneer surfaces
3. Duplicate master cast using polyvinyl siloxane impression material
4. Pour refractory cast and trim to include one tooth on each side of the veneer area
5. Mark margins of refractory cast using a wax pencil
6. Degas the refractory cast IAW manufacturer's directions
7. Soak the refractory cast in distilled water until no air bubbles appear
8. Apply wash coat of dentine porcelain and fire IAW manufacturer's directions
9. Repeat soaking procedure and build dentine porcelain to full contour
10. Cut back dentine build up and apply enamel porcelain, over-building slightly
11. Fire porcelain build up IAW manufacturer's directions
12. Contour fired porcelain to duplicate contours of surrounding dentition
13. Color correct the veneer to the prescribed shade and fire to a glaze
14. Remove bulk refractory material by grinding with a #8 bur
15. Blast veneer with aluminum oxide or glass beads under low pressure
16. Fit veneer to master cast using disclosing medium and microscope
17. Clean and disinfect veneer
18. Etch intaglio surface of veneer and apply silane coupling agent IAW manufacturer's directions

MODULE 24. FABRICATING PORCELAIN LAMINATE VENEERS

PERFORMANCE CHECKLIST

INSTRUCTIONS:

The trainee must be able to fabricate porcelain laminate veneers and satisfactorily perform all parts of the task without assistance. Ensure proper safety precautions are followed. Evaluate the trainee's performance using this checklist.

FABRICATING PORCELAIN LAMINATE VENEERS

DID THE TRAINEE…?	YES	NO
1. Inspect the master cast for accuracy, block out undercuts and apply the prescribed thickness of die spacer		
2. Accurately duplicate the master cast in polyvinyl siloxane impression material and pour a bubble free refractory cast		
3. Degas the refractory cast IAW manufacturer's directions		
4. Soak the refractory cast to saturation in distilled water, apply a wash coat of dentine porcelain and fire to maturity		
5. Soak the refractory cast to saturation in distilled water, build dentine and enamel porcelain to anatomic contour and fire to maturity		
6. Contour the fired veneer, duplicating the anatomic form of the surrounding dentition		
7. Color correct the veneer to the prescribed shade and fire to a glaze		
8. Bulk grind the refractory material from the veneer and blast away residual refractory material without breakage		
9. Accurately reseat the veneer to the master cast, ensuring margins are smooth and closed		
10. Etch the veneer and apply silane coupling agent IAW manufacturer's directions		

FEEDBACK:

Using this checklist as a source of information, discuss the trainee's performance indicating strengths and weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, both the trainer and trainee should certify performance by appropriately documenting the OJT record.

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Dental Laboratory Qualification Training Progress Record

Rank/Name _____

(Circle One)

Qualification Upgrade Training to: **5-Skill Level** **7-Skill Level**

Volume 2. Fabricating Fixed Restorations					
Core Task	***Module Number***	***Page Number***	***Module Title***	***Date Completed***	***Trainer's Initials***
⑤	1.	1	Fabricating Post and Cores		
	2.	4	Fabricating Interim Crowns and Fixed Partial Dentures		
⑤	3.	7	Waxing Fixed Prosthodontic Patterns to Anatomical Form		
	4.	10	Constructing Custom Incisal Guide Tables		
⑤⑤⑤	5.	12	Waxing Metal-Ceramic and Metal-Resin Substructure Patterns		
⑤	6.	14	Spruing and Investing Wax Patterns		
⑤⑤	7.	17	Casting Fixed Restorations		
⑤	8.	20	Finishing and Polishing Fixed Restorations		
⑤	9.	23	Soldering Crowns		
⑤	10.	26	Soldering Fixed Partial Dentures		
⑤	11.	29	Veneering Metal-Resin Restorations		
⑤	12.	32	Finishing Metal-Ceramic Restorations		
⑤⑦	13.	35	Presoldering Metal-Ceramic Substructures		
⑤	14.	37	Opaquing Metal-Ceramic Substructures		
⑤	15.	40	Building Porcelain to Anatomical Form		
⑤	16.	43	Firing Porcelain Restorations		
⑤	17.	45	Contouring Metal-Ceramic Restorations		
⑦⑤	18.	47	Staining and Glazing Metal-Ceramic Restorations		
⑤⑦	19.	49	Postsoldering Metal-Ceramic Restorations		
⑦⑦	20.	51	Fabricating Metal-Ceramic Fixed Partial Dentures		
⑤⑦	21.	54	Fabricating Surveyed Crowns		
⑦	22.	57	Fabricating Fixed Restorations using Nonrigid Connectors		
⑦⑦	23.	60	Fabricating Resin-Bonded Fixed Partial Dentures		
	24.	63	Fabricating Porcelain Laminate Veneers		

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MEMORANDUM FOR 381 TRS/XWAA (CDC Manager)
917 Missile Rd
Sheppard AFB TX 76311-2246

FROM:

SUBJECT: Qualification Training Package Improvement

1. Identify volume and module.

   Volume #_____

   Module # and title_____

2. Identify improvement/correction section(s)

_____ STS Task reference	_____ Performance Checklist
_____ Training Reference	_____ Feedback
_____ Evaluation Instructions	_____ Format
_____ Performance Resources	_____ Other
_____ Steps in Task Performance	

3. Recommended changes--use a continuation sheet if necessary.

_____
_____
_____
_____

4. Thank you for your time and interest.

YOUR NAME, RANK, USAF
Title/Position